CLAIMS

What is claimed as new and desired to be protected by Letters Patent of the United States is:

1. A method of fabricating a Zener diode, comprising a fabrication process of:

growing a silicon oxide layer onto a silicon wafer doped with a first dopant;

implanting a second dopant into said silicon wafer through the silicon oxide layer without discrete masking;

annealing said silicon wafer;

removing said silicon oxide layer from said silicon wafer; and

metallizing said silicon wafer.

2. The method of claim 1, wherein said silicon wafer is homogeneously doped with a mono-crystalline N-type dopant.

3. The method of claim 2, wherein said N-type silicon wafer has a <111> crystal orientation.

4. The method of claim 2, wherein said N-type silicon wafer has a <100> crystal orientation.

5. The method of claim 2, wherein said silicon wafer is doped with 1×10^{16} to 1×10^{19} atoms of N-type dopant per cubic centimeter of said silicon wafer.

6. The method of claim 5, wherein said doping produces a silicon wafer having a resistivity of .001 to 1 ohm per centimeter.

7. The method of claim 1, wherein said second dopant comprises boron.

8. The method of claim 7, wherein said boron is implanted at the order of 1 x 10^{17} ions per cubic centimeter of said silicon wafer at an energy level of 30 to 70 keV.

9. The method of claim 1, further comprising the step of scribing said silicon wafer prior to growing said oxide layer.

10. The method of claim 1, further comprising the step of scribing said silicon wafer after said step of growing said oxide layer but prior to said step of metallizing said silicon wafer.

11. The method of claim 1, wherein said silicon wafer is scribed during said fabrication process.

12. The method of claim 1, wherein said silicon wafer is scribed after said fabrication process.

13. A Zener diode, comprising:

a substrate doped with 1 x 10^{16} to 1 x 10^{19} atoms of a N-type dopant per cubic centimeter of said substrate; and

a P-type layer implanted into said substrate through a silicon oxide layer without masking, said P-type layer doped with 1 x 10^{17} atoms of a P-type dopant per centimeter of said substrate;

wherein said N-type dopant and P-type dopant form a PN junction.

14. The diode of claim 13, wherein a physical area of said Zener diode is 1 to 5 thousandths of a square inch.

15. A series-wired light string, comprising:

a plurality of light bulbs;

a plurality of light sockets, each light socket of said plurality of light sockets adapted to receive at least one light bulb of said plurality of light bulbs; and

a plurality of voltage-responsive shunts, each shunt being electrically connected in parallel across a respective light socket to maintain a current passing through the light socket in the event that a light bulb is not illuminated or is missing from the light socket;

wherein each of said shunts comprises at least one Zener diode formed without a mask according to the method of claim 1.

16. The circuit of claim 15, wherein each of said shunt comprises a back-to-back Zener diode pair.

17. The circuit of claim 15, wherein said Zener diode has a physical area greater than 500 millionths of a square inch.